



PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of : Confirmation No. 4336
Ian E. Kibblewhite, et al. : Group Art Unit 2855
Application No. 10/528,515 : Examiner: Jonathan M. Dunlap
Filing Date: October 26, 2005 : (571) 272-1335
For a Patent for :
THREAD FORMING FASTENERS :
FOR ULTRASONIC LOAD :
MEASUREMENT AND CONTROL :

DECLARATION OF IAN E. KIBBLEWHITE

Mail Stop Amendment
Commissioner for Patents
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Alexandria, VA 22313-1450

Sir:

I, Ian E. Kibblewhite, hereby declare that:

1. I am one of the two joint inventors named in the above-referenced U.S. Patent Application No. 10/528,515.

2. An Office Action issued in connection with the above-identified U.S. Patent Application No. 10/528,515, on May 8, 2007, formulates various rejections of claims under 35 U.S.C.

§103(a) which are based, primarily, on a proposed combination of U.S. Patent No. 5,242,253 (Fulmer) and U.S. Patent No. 5,131,276 (Kibblewhite).

3. Paragraph 6 of the Office Action correctly states that Fulmer discloses a thread forming fastener including a head for engagement by a tool, for applying a torque to the fastener, and a body portion extending from the head and including thread forming portions. It is also correctly stated that "Fulmer fails to disclose an ultrasonic transducer coupled with the fastener, for making ultrasonic load measurements in the fastener".

4. Following this, Paragraph 7 of the Office Action correctly states that Kibblewhite discloses an ultrasonic transducer coupled with a fastener, for making ultrasonic load measurements in the fastener.

5. Following this, Paragraph 7 of the Office Action states a conclusion that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to couple an ultrasonic transducer for load measurements to a fastener". Motivation for reaching this conclusion is said to be found in Kibblewhite, at lines 15 and 16 of column 6, which state that the disclosed "load indicating member can be formed from a bolt, rod, rivet, stud or other suitable structural element".

6. The person of ordinary skill in this art, at the time the present invention was made, would not have considered it obvious to couple an ultrasonic transducer for load measurements to a thread forming fastener and would not have been motivated to reach such a conclusion by the disclosure found in Kibblewhite.

7. Fulmer teaches that "[c]onsiderable torque is required in forming the threads on the screw's shank" (Col. 1, lines 21 and 22), and discloses a thread forming portion that "reduc[es] the force required for thread-forming" (Col. 8, lines 7 to 15), making it "possible to achieve the thread-forming operations in a much easier manner since a lower torque is required" (Col. 3, lines 61 to 68).

8. From Kibblewhite, the person of ordinary skill in the art at the time the present invention was made would have known that "ultrasonic tension measurement is recognized as a highly accurate laboratory tightening method for calibration, application testing and for tightening very critical joints" (Col. 1, lines 57 to 61).

9. As a result of the considerable amount of torque required to perform the thread-forming operations associated with the run-down of a thread forming fastener, even in view of the reduced torque required for the run-down of Fulmer's thread

forming fasteners, the person of ordinary skill in the art at the time the present invention was made would have known that heat generated as a result of the thread-forming work that takes place during the thread-forming run-down stage of the installation of a thread forming fastener would result in a slight increase in temperature in both the thread forming fastener and the resulting joint (note, Page 6, lines 2 to 7, of the specification for the above-identified U.S. Patent Application No. 10/528,515).

10. The person of ordinary skill in the art at the time the present invention was made would also have known that such an increase in temperature could cause errors in ultrasonic load measurements to be taken in thread forming fasteners because of thermal expansion effects, and that without compensation, such thermal effects could result in inaccuracies of load measurement on the order of 5% to 20%, depending on the thread forming fastener, the joint and the assembly process to be used (note, Page 6, lines 7 to 9 and 19 to 22 of the specification for the above-identified U.S. Patent Application No. 10/528,515).

11. The person of ordinary skill in the art at the time the present invention was made would also have known that when using ultrasonics for inspecting the load in a fastener, it is usual to measure the temperature of the fastener or the joint in order to compensate for the effects of thermal expansion, but

that in conjunction with a thread forming fastener, the average temperature increase due to the heat generated during thread formation could not have been measured directly during the installation process and would have been subject to variations in material, friction and heat conduction properties of the joint components (note, Page 6, lines 9 to 19 of the specification for the above-identified U.S. Patent Application No. 10/528,515).

12. Consequently, the person of ordinary skill in the art at the time the present invention was made would not have known how to directly measure the average temperature increase due to the heat generated during thread formation during the installation process, and would not have known how to compensate for the effects of thermal expansion in conjunction with a thread forming fastener.

13. Without knowing how to directly measure the average temperature increase due to the heat generated during thread formation during the installation process, and how to compensate for the effects of thermal expansion in conjunction with a thread forming fastener, the person of ordinary skill in the art at the time the present invention was made would have expected that the thermal effects encountered in the run-down of a thread forming fastener would result in inaccuracies of load measurement on the order of 5% to 20%.

14. Consequently, the person of ordinary skill in the art at the time the present invention was made would not have known to, or even considered coupling the ultrasonic transducer of Kibblewhite with the thread forming fastener of Fulmer because the expected inaccuracies in the load measurements made during run-down of the thread forming fastener would not have been considered appropriate for critical joint applications.

15. Lines 15 and 16 of column 6 of Kibblewhite state that the disclosed "load indicating member can be formed from a bolt, rod, rivet, stud or other suitable structural element" (emphasis added). Because the person of ordinary skill in the art at the time the present invention was made would not have known how to directly measure the average temperature increase due to the heat generated during thread formation during the installation process, and how to compensate for the effects of thermal expansion in conjunction with a thread forming fastener, and would have expected inaccuracies not considered suitable for critical joint applications, the person of ordinary skill in the art at the time the present invention was made would have expected that thread forming fasteners were not "suitable" as a load indicating member useful for critical joint applications.

16. Under such circumstances, the person of ordinary skill in the art at the time the present invention was made could

not have predicted that a thread forming fastener would be a suitable structural element for implementation as the load indicating member disclosed by Kibblewhite, and would not have predicted that the ultrasonic transducer of Kibblewhite could be effectively coupled with the thread forming fasteners of Fulmer.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: 11/2/07

BY: 
Ian E. KIBBLEWHITE